

Appln No. 09/926,230
Supp Amendment to reply of June 24, 2003

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

Claim 1. (Currently Amended) A process for modifying starch, comprising:
heating starch with at least one cationic polymer in an aqueous medium to
temperatures above the gelatinization temperature of said starch, wherein the starch is
selected from the group consisting of the native starches, the oxidized native starches, the
starch ethers, the starch esters, the ~~anionic starches~~ of oxidized starch ethers, and the oxidized
starch esters, the cationic modified starches and the amphoteric starches and effecting said
modifying of said starch in the presence of a combination of

(a) a polymeric cationizer selected from the group consisting of polymers containing
vinylamine units and having molecular weights Mw of up to 1 million, polyethyleneimines,
polydiallyldimethylammonium chlorides, condensates of dimethylamine with epichlorohydrin
or dichloroalkanes, condensates of dichloroethane and ammonia, and mixtures thereof; and

(b) a polymeric papermaking drainage aid selected from the group consisting of a
water-soluble crosslinked polyamidoamine with or without an ethyleneimine graft, a polymer
containing acrylamide and/or methacrylamide units and having a molecular weight Mw of
more than 1 million, a polymer containing vinylamine units and having a molecular weight
Mw of more than 1 million, and mixtures thereof.

Claim 2. (Previously Amended) The process as claimed in Claim 1, wherein

(a) said polymeric cationizer is selected from the group consisting of

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polyethyleneimines, polymers containing vinylamine units and having molecular weights Mw of up to 1 million, and

(b) said polymeric drainage aid is selected from the group consisting of a water-soluble, ethyleneimine-grafted, a crosslinked polyamidoamine, a polymer containing vinylamine units and having a molecular weight Mw ranging from 1.2 to 30 million, and a cationic polyacrylamide or nonionic polyacrylamide each having a molecular weight Mw of not less than 1.5 million.

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Claim 3. (Previously Amended) The process as claimed in Claim 1, wherein said starch is a native starch.

Claim 4. (Currently Amended) The process as claimed in Claim 1, wherein said starch is selected from the group consisting of the starch ethers, the starch esters, the oxidized native starch, and the anionic starches of oxidized starch ethers and the oxidized starch esters.

Claim 5. (Currently Amended) The process as claimed in Claim 1, wherein said starch, prior to modification, is an anionic starch.

Claim 6. (Previously Amended) The process as claimed in Claim 1, wherein said starch is an anionic starch that contains carboxyl, phosphate or sulfate groups or the respective alkali metal or ammonium salts thereof.

Claim 7. (Previously Amended) The process as claimed in Claim 1, wherein said anionic starch is a carboxyl- and/or carboxylato-containing starch from potatoes, maize, wheat or tapioca.

Claim 8. (Previously Amended) The process as claimed in Claim 1, wherein said starch is heated in said aqueous medium to 115 - 170°C under superatmospheric pressure.

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Claim 9. (Previously Amended) The process as claimed in Claim 1, wherein said heating of said starch is effected with at least one polymeric cationizer and at least one polymeric drainage aid in a jet cooker at a temperature ranging from 120 to 150° C in the course of from 0.01 sec to 30 minutes.

Claim 10. (Previously Amended) The process as claimed in Claim 1, wherein, based on 100 parts by weight of starch, from 0.1 to 10 parts by weight of at least one polymeric cationizer (a) is combined with from 0.01 to 2 parts by weight of at least one drainage aid (b) for the modification of said starch.

C1 Claim 11. (Previously Amended) A reaction product of starch with a cationic polymer obtainable by the process of Claim 1.

Claim 12. (Canceled).

Claim 13. (Previously Amended) A process for producing paper, paperboard or cardboard, comprising:

adding a dry strength enhancer prepared by the process of Claim 1 to a paper stock;
and

draining said treated paper stock onto a sieve which results in the formation of a sheet on the sieve, thereby forming a paper, paperboard or cardboard of improved dry strength.

Claim 14. (Previously Added) The process as claimed in Claim 1, wherein said drainage aid is a copolymer prepared by reacting:

- i) from 70 to 97 % by weight of acrylamide and/or methacrylamide,
- ii) from 2 to 20 % by weight of N-vinylimidazoline or N-vinyl-2-methylimidazoline, salts of these monomers and/or alkylator-quaternized N-vinylimidazoline or N-vinyl-2-

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methylimidazoline, and

iii) from 1 to 10 % by weight of N-vinylimidazole.

Claim 15. (Previously Added) The process as claimed in Claim 1, wherein said drainage aid is a copolymer prepared by reacting:

i) from 1 to 99 mol % of (meth)acrylamide with

ii) from 99 to 1 mol % of a dialkylaminoalkyl(meth)acrylamide.

C1 Claim 16. (Previously Added) The process as claimed in Claim 1, wherein the pH of the starch modification reactions ranges from 2.0 to 9.0.

Claim 17. (Previously Added) The process as claimed in Claim 1, wherein said polyamidoamine drainage aid has from 1 to 50 ethyleneimine units grafted thereon per basic nitrogen atom of the polyamidoamine.

Claim 18. (Previously Added) A paper, paperboard or cardboard product, comprising:

a paper, paperboard or cardboard modified with from 0.5 to 8.0 % by weight of the reaction product of Claim 11.